

# DC-Micromotors

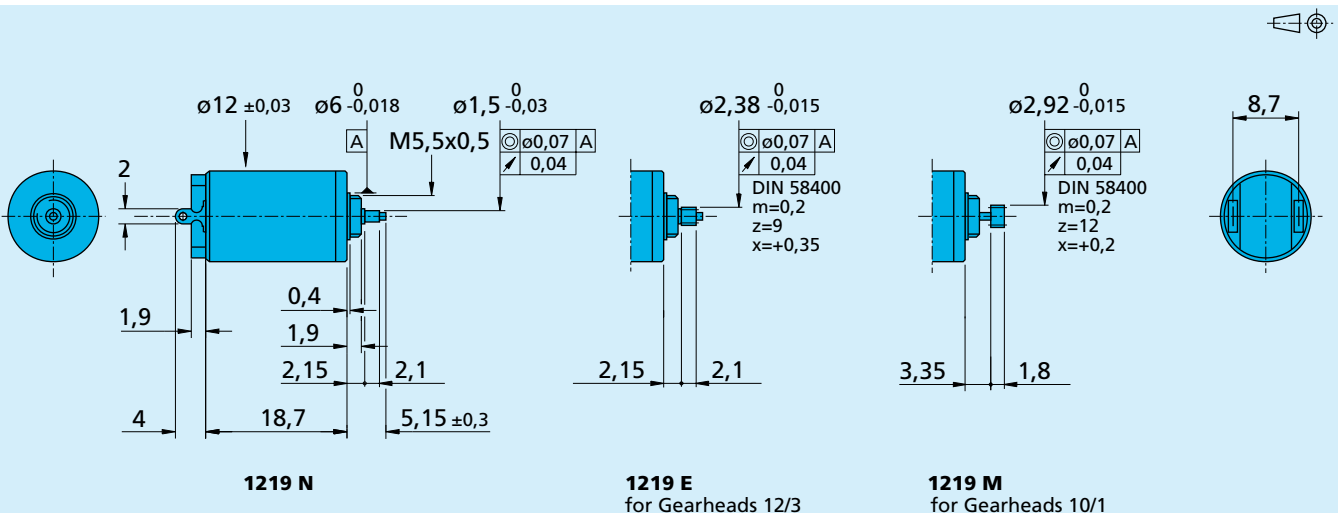
## Precious Metal Commutation

0,60 mNm

For combination with (overview on page 14-15)  
 Gearheads:  
 10/1, 12/3  
 Encoders:  
 30B

### Series 1219 ... G

	1219 N	4,5 G	006 G	012 G	015 G	
1 Nominal voltage	$U_N$	4,5	6	12	15	Volt
2 Terminal resistance	R	10,7	17,6	69,0	131	$\Omega$
3 Output power	$P_{2 \max.}$	0,46	0,49	0,50	0,41	W
4 Efficiency	$\eta_{\max.}$	74	73	72	70	%
5 No-load speed	$n_0$	15 300	16 000	16 000	16 200	rpm
6 No-load current (with shaft $\varnothing$ 0,8 mm)	$I_0$	0,008	0,007	0,004	0,003	A
7 Stall torque	$M_H$	1,14	1,17	1,19	0,96	mNm
8 Friction torque	$M_R$	0,02	0,02	0,03	0,03	mNm
9 Speed constant	$k_n$	3 460	2 721	1 364	1 109	rpm/V
10 Back-EMF constant	$k_E$	0,289	0,368	0,733	0,902	mV/rpm
11 Torque constant	$k_M$	2,76	3,51	7,00	8,61	mNm/A
12 Current constant	$k_I$	0,362	0,285	0,143	0,116	A/mNm
13 Slope of n-M curve	$\Delta n / \Delta M$	13 413	13 642	13 447	16 875	rpm/mNm
14 Rotor inductance	L	150	300	1 200	1 600	$\mu$ H
15 Mechanical time constant	$\tau_m$	20	20	18	19	ms
16 Rotor inertia	J	0,14	0,14	0,13	0,11	gcm <sup>2</sup>
17 Angular acceleration	$\alpha_{\max.}$	81	84	92	87	$\cdot 10^3$ rad/s <sup>2</sup>
18 Thermal resistance	$R_{th 1} / R_{th 2}$	17 / 48				K/W
19 Thermal time constant	$\tau_{w1} / \tau_{w2}$	3,5 / 386				s
20 Operating temperature range:						
– motor		– 30 ... + 85 (optional – 30 ... + 125)				°C
– rotor, max. permissible		+ 85 (optional + 125)				°C
21 Shaft bearings		sintered bronze sleeves	ball bearings			
22 Shaft load max.:		(standard)	(optional)			
– with shaft diameter		0,8	1,0			mm
– radial at 3 000 rpm (1,5 mm from bearing)		0,5	5			N
– axial at 3 000 rpm		0,1	0,5			N
– axial at standstill		20	5			N
23 Shaft play:						
– radial	$\leq$	0,03	0,02			mm
– axial	$\leq$	0,2	0,2			mm
24 Housing material		steel, nickel plated				
25 Weight		11				g
26 Direction of rotation		clockwise, viewed from the front face				
<b>Recommended values - mathematically independent of each other</b>						
27 Speed up to	$n_{e \max.}$	12 000	12 000	12 000	12 000	rpm
28 Torque up to	$M_{e \max.}$	0,60	0,60	0,60	0,60	mNm
29 Current up to (thermal limits)	$I_{e \max.}$	0,260	0,200	0,100	0,070	A



# Planetary Gearheads

0,1 Nm

For combination with (overview on page 14-15)  
DC-Micromotors:  
1016, 1024, 1219, 1224

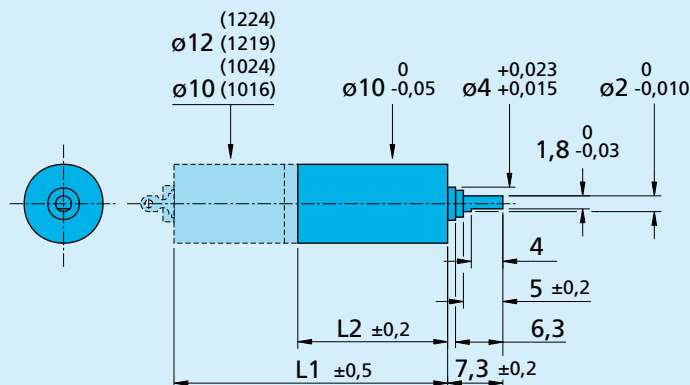
## Series 10/1

	10/1	10/1 K
Housing material	metal	metal
Geartrain material	all steel	all steel
Recommended max. input speed for:		
– continuous operation	5 000 rpm	5 000 rpm
Backlash, at no-load	$\leq 3^\circ$	$\leq 3^\circ$
Bearings on output shaft	sintered sleeve bearings	preloaded ball bearings
Shaft load, max.:		
– radial (5 mm from mounting face)	$\leq 1 \text{ N}$	$\leq 7 \text{ N}$
– axial	$\leq 2 \text{ N}$	$\leq 5 \text{ N}^{1)}$
Shaft press fit force, max.	$\leq 10 \text{ N}$	$\leq 5 \text{ N}^{1)}$
Shaft play (on bearing output):		
– radial	$\leq 0,03 \text{ mm}$	$\leq 0,02 \text{ mm}$
– axial	$\leq 0,10 \text{ mm}$	$= 0 \text{ mm}^{1)}$
Operating temperature range	$-30 \dots +100^\circ\text{C}$	$-30 \dots +100^\circ\text{C}$

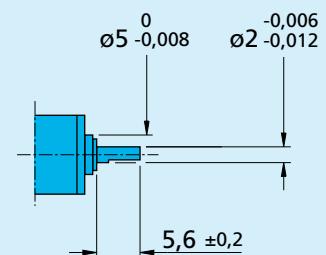
## Specifications

reduction ratio	weight without motor	length without motor L2	length with motor				output torque		direction of rotation (reversible)	efficiency
			1016 M L1 mm	1024 M L1 mm	1219 M L1 mm	1224 M L1 mm	continuous operation M max. mNm	intermittent operation M max. mNm		
4:1	6 g	9,7	25,4	33,4	28,4	33,9	5	200	=	90
16:1	7	12,8	28,5	36,5	31,5	37,0	15	200	=	80
64:1	8	15,9	31,6	39,6	34,6	40,1	54	200	=	70
256:1	10	19,0	34,7	42,7	37,7	43,2	100	200	=	60
1 024:1	11	22,1	37,8	45,8	40,8	46,3	100	200	=	55
4 096:1	13	25,2	40,9	48,9	43,9	49,4	100	200	=	48

<sup>1)</sup> Limited by the preloaded ball bearings.  
A higher axial load negates the preload.



10/1



10/1 K  
L1, L2 = + 1